

AMENDMENTS TO THE SPECIFICATION:

Please replace the paragraph beginning on page 1, lines 6-10 with the following paragraph:

The invention relates to a process for producing a tool insert for injection molding a part, the part being fabricated of a synthetic material, a metal or a ceramic material and having an arrangement of microchannels along with an arrangement of through-going orifices ~~which extend in a substantially perpendicular manner with respect to an outer surface of the part.~~ The invention also relates to a process of molding a part using the tool insert.

Please replace the paragraph beginning on page 1, line 25 to page 2, line 3 with the following paragraph:

The requirements in micro-injection molding processes for the piercing punches to fit accurately into the tools, in particular on the microstructured tool halves, are much higher than in conventional injection molding processes, the reason being, that in order to form microstructures of identical shapes, the material melt must have an extremely low viscosity, but this increases the risk that the material melt penetrates between the piercing punch and the tool into where they fit together, where it forms a brew flash. This brew flash can lead to the connection between the through-going orifice and the microchannel becoming partially or completely blocked, thus rendering the microchannel and the entire part unusable. A further disadvantage is that the through-going orifices in the case of microstructured parts must also be small, on the one hand so that they do not occupy unnecessary space and on the other hand so that they receive extremely small volumes of fluid. The manufacturing costs are correspondingly higher. At this moment in time fitting orifices for piercing punches with a diameter of less than 1 millimeter can currently only be produced with the required precision at great effort and cost.

Please replace the paragraph beginning on page 3, line 28 to page 4, line 12 with the following paragraph:

In accordance with a second aspect of the invention this second aim is achieved with a second process of the above-mentioned kind, wherein a tool is used for the injection molding process which is formed from a first and a second tool half, and which comprises the following steps:

(a) installing a first tool insert [as] in a first tool half which serves to shape the arrangement of microchannels, wherein the first tool insert is produced according to a process of the above-mentioned kind and has a first arrangement of piercing punches integrated in the first tool insert,

(b) installing a second tool insert [as] in a second tool half which is arranged opposite the first tool half, wherein the second tool insert has a second arrangement of piercing punches which push on a corresponding piercing punch of the first arrangement in each case as the tool for the injection molding is closed,

(c) closing the tool for injection molding formed from the first and second tool [insert] half,

(d) injecting a material melt into the cavity between the first and the second tool [insert] half,

(e) cooling the injected material melt, and

(f) ejecting from the tool for injection molding a part which is formed by the setting of the injected material melt and which part comprises an arrangement of through-going orifices which are formed during the injection molding process by the piercing punches pushing against each other.

Please replace the paragraph beginning on page 4, lines 17-31 with the following paragraph:

Using the process in accordance with the invention, the piercing punches are integrated into a microstructured tool insert. This obviates the need for a transition to the microchannel and tool in the form of a gap and there is absolutely no risk of a ~~brew~~-flash forming between the respective piercing punch and microchannel tool insert. Piercing punches produced in this manner are called 'integrated piercing punches' as they are integrated parts of the tool insert. Integrated piercing punches of this type can be produced in accordance with the invention in any shape and as small as desired. As they are produced in the batch process, as many integrated piercing punches as desired can be produced simultaneously, which has an extremely advantageous effect on the flow time, quality and costs. In accordance with the invention, in order to produce the microstructured tool

insert lithographic, chemical and physical microstructuring processes are used, which are batch processes. However, most mechanical structuring processes (for example, drilling, milling, polishing) are performed sequentially which particularly in the case where there are a large number of structures has a crucial effect on the time involved and has a negative effect with respect to the flow time, quality and costs.

Please replace the paragraph beginning on page 5, lines 19-21 with the following paragraph:

Figure 5 illustrates the use of a metal layer separated from the first wafer and from the carrier substrate bonded thereto as a shaping ~~part of a tool insert~~ component in a tool half which is produced in accordance with the invention and is used as a component of a tool half of a tool for injection molding a part,

Please replace the paragraph beginning on page 8, lines 11-15 with the following paragraph:

It is particularly advantageous when using the above described piercing punches 18 integrated in the tool insert that the risk of ~~breaks~~ flashes occurring on the microstructured side of the synthetic material part is eliminated in particular in each case between the through-going orifice and the microchannel. Moreover, extremely small through-going orifices can also be produced easily.